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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,963	02/17/2004	Frank Holler	3081.55US01	9112
24113	7590	03/03/2006	EXAMINER	
PATTERSON, THUENTE, SKAAR & CHRISTENSEN, P.A.			CHANG, AUDREY Y	
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MINNEAPOLIS, MN 55402-2100			2872	

DATE MAILED: 03/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/779,963

Applicant(s)

HOLLER, FRANK

Examiner

Audrey Y. Chang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on **December 16, 2005** has been entered.
2. This Office Action is also in response to applicant's amendment filed on December 16, 2005, which has been entered into the file.
3. By this amendment, the applicant has amended claims 1, 11 and 21.
4. The rejections of claims 1-20 under 35 USC 112, first paragraph, with regard to newly added matters set forth in the previous Office Action are withdrawn in response to the amendment.
5. Claims 1-30 remain pending in this application.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. **Claims 1-30 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification and the claims fail to teach that by simply having a control unit for adjusting the refractive index of the lens the object plane will coincide with the image plane. In particularly claims 1,

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11 and 21 have been amended to state that the light coming from the object is transmitted through second beam splitter to the viewer which completely has nothing to do with the variable focusing unit and the control unit for adjusting the object plane. Also the image light from the image generating device and the light from the object do not seem to have anything to do with each other it is therefore not clear how could the image plane and the object plane be coincide and what does it mean by that?

In order to make the object plane coincide with the image plane, in particularly referred to the image plane for the image generated from the image generating device, the light from the object also has to travel through the first beam splitter (8, Figure 1 of the specification) and a third beam splitter (11) to an *auto-focus sensor* (11) to determine the control signal required to drive **both** the *control unit* (6) and *image control unit* (13) to **adjust** the refractive index of the variable focusing lens and to *adjust the image module* (2) or the image generating device to adjust the image generated therefrom so that the image plane and object plane can be coincide and the generated image from the image generating means and the object are superimposed. At this juncture the claims are not enabling for the claimed superposition of the generated image and the object and not enabling the coincide of the object plane and the image plane.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. **Claims 1-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Fergason (PN. 6,379,009) in view of the patents issued to Spitz (PN. 5,886,822) and Piosenka et al (PN. 5,359,444).**

Ferguson teaches a conjugate optics *projection display* that is comprised of an *image projector* (16, Figures 1 and 2) for generating an image in an image plane and a *first and second beam splitters* (14 and 12, **claims 1, 11 and 21**) serves as the *superimposing unit* such that the *projected image* via conjugate optics will be *superimposed* on a real, actual *object* (11) at an *object plane* and the superimposed image will be viewed by an observer (10), wherein the image projector and the superimposing unit are *mounted* on a *head wearable support unit*, (please see Figures 1-2, the abstract and columns 3-4).

With regard to the amendment to **claims 1, 11 and 21**, concerning the first and second beam splitters, **Ferguson** teaches that the first beam splitter (11) passes the image light from the image projector to the second beam splitter which then deflects the light to the viewer and the light from the object transmitted through the second beam splitter (12) to the observer. Although this reference does not teach explicitly that the first beam splitter “*deflects*” the image light from the image projector to the second beam splitter, such modification is really referred to the geometric arrangement of the image projector and it does not really affect the optical function of the image projector and the viewing. In fact, **Spitzer** in the same field of endeavor teaches an arrangement for viewing superimposed view of the *generated image* from image display device (320, Figure 8) and the object or ambient scene (306) wherein the first beam splitter (325) deflects the image light from the image display device to the second beam splitter (324) which then deflects the image light to the viewer, (please see Figure 8). It would have been obvious to one skilled in the art to apply the teachings of **Spitzer** to rearrange the positions of the image projector and the beam splitter to make the first beam splitter “*deflects*” the image light from the image projector to the second beam splitter for the benefit of providing an alternative design for the projection display.

Ferguson teaches that the projected image is intended to be superimposed with the actual and real object in order to enhanced the viewing of the actual object, this implicitly means that the image plane and the object plane *coincide* with each other and it is implicitly true that an image projector implicitly comprises a *focusing unit* for forming the image at the image plane. However this reference does not

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teach explicitly that the focusing unit comprises a lens having variable refractive index and a control unit for adjusting the refractive index therefore controls the focus of the lens.

Piosenka et al in the same field of endeavor teaches an *auto-focusing optical apparatus* that includes a *lens* containing *liquid crystal material* with *variable refractive index* wherein the refractive index is controlled by the amount of voltage or electrical field applied (with respect to *claims 4-6 and 14-16 and newly added claims 24-26*) and the focus of the lens via the change of the refractive index is adjusted according to the measured distance between the support of the lens and the object plane and the distance between the observer's eyes and the support for the lens, (please see Figure 11 and the abstract). Piosenka et al further teaches, (with respect to *claims 2-3, 8-9, 12-13 and 18-20 and newly added claims 21-22, and 28-30*), that a *measurement module* is included to measure the distances mentioned above and the measurement module includes a *lens control* for controlling the focus of the liquid crystal lens, (please see Figure 12). It would then have been obvious to one skilled in the art to apply the teachings of Piosenka et al to replace the focusing unit in the image projector of the Ferguson to make the focusing lens an *auto-focusing lens* to ensure the image generated from the image projector is *always properly* focused and superimposed on the real actual object since the projection display disclosed by Ferguson is a head mount display wherein by the motion of the observer the projected image will easily be off-focused from the actual real object and lose the purpose of superimposing the projected image with the real actual object.

Piosenka et al teaches that infrared sensor is used to detect the position of the object to give the information for auto-focus adjustment. Although it does not teach explicitly that the auto-focus sensor or the infrared sensor is receiving the object information through a first beam splitter, (with respect to the newly added claim 21), however such modification is considered obvious to one skilled in the art since it only involves rearranging the geometry of the device that does not affect the function of the auto-focusing sensor and the auto-focusing adjustment at all.

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With regard to claims 7 and 17 and newly added claim 27, Fergason teaches that the superimposing unit comprises a beam splitter that includes a splitter mirror, (12).

10. Claims 1, 4-7, 10, 11, 14-17 and 20 and newly added 21, 24-27, 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Fergason (PN. 6,379,009) in view of the patents issued to Spitz (PN. 5,886,822) and Baba et al (PN. 4,802,746).

Fergason teaches a conjugate optics *projection display* that is comprised of an *image projector* (16, Figures 1 and 2) for generating an image in an image plane and a first and second *beam splitter* (14 and 12, with regard to amended claims 1 and 11 and newly added claim 21) serves as the *superimposing unit* such that the *projected image* via conjugate optics will be *superimposed* on a real, actual *object* (11) at an *object plane* and the superimposed image will be viewed by an observer (10), wherein the image projector and the superimposing unit are *mounted on a head wearable support unit*, (please see Figures 1-2, the abstract and columns 3-4).

With regard to the amendment to claims 1, 11 and 21, concerning the first and second beam splitters, **Fergason** teaches that the first beam splitter (11) passes the image light from the image projector to the second beam splitter which then deflects the light to the viewer and the light from the object transmitted through the second beam splitter (12) to the observer. Although this reference does not teach explicitly that the first beam splitter “*deflects*” the image light from the image projector to the second beam splitter, such modification is really referred to the geometric arrangement of the image projector and it does not really affect the optical function of the image projector and the viewing. In fact, **Spitzer** in the same field of endeavor teaches an arrangement for viewing superimposed view of the *generated image* from image display device (320, Figure 8) and the object or ambient scene (306) wherein the first beam splitter (325) deflects the image light from the image display device to the second beam splitter (324) which then deflects the image light to the viewer, (please see Figure 8). It would have been obvious to

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one skilled in the art to apply the teachings of **Spitzer** to rearrange the positions of the image projector and the beam splitter to make the first beam splitter “deflects” the image light from the image projector to the second beam splitter for the benefit of providing an alternative design for the projection display.

Ferguson teaches that the projected image is intended to be superimposed with the actual and real object in order to enhanced the viewing of the actual object, this implicitly means that the image plane and the object plane *coincide* with each other and it is implicitly true that an image projector comprises *focusing unit* for forming the image at the image plane. However this reference does not teach explicitly that the focusing unit comprises a lens having variable refractive index and a control unit for adjusting the refractive index therefore controls the focus of the lens.

Baba et al in the same field of endeavor teaches a *variable focus optical element* wherein the variable focus optical element utilizes a *liquid crystal material* with *variable refractive index* such that the refractive power of the lens is adjustable via and in response to a *focus detecting device*, (please see Figures 9-10, column 2, lines 3-38 and column 13, lines 64-69). With regard to claims 4-6, 14-16, and 24-26, Baba et al teaches that the variable focus optical element utilizes liquid crystal material, which is an electro-optical material, such that the refractive index of the liquid crystal is varied or adjusted in response electrical field applied, (please see column 13, line 64 to column 14, line 2). With regard to claims 10, 20 and 30, Baba et al further teaches that the focus detecting device comprises a *measurement module* including *an image sensor* (39, Figures 9-13), which detects the image light from the object via the variable focus optical element (32) and a sharpness detecting circuit (42), such that based on the sharpness of the image detected a control signal is send to control the refractive power and therefore the focus of the variable focus optical element. This variable focusing optical element and the focus-detecting unit therefore together serves as the auto-focus unit, (please see column 9, line 36 to column 10, line 14 of Baba et al). It would then have been obvious to one skilled in the art to apply the teachings of **Baba et al** to replace the focusing unit in the projector of the **Ferguson** to make the focusing lens a focus

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variable lens with a focusing detecting device to *ensure* the image generated from the image projector is *always properly* focused and superimposed on the real actual object since the projection display disclosed by Ferguson is a head mount display wherein by the motion of the observer the projected image will easily be off-focused from the actual real object and lose the purpose of superimposing the projected image with the real actual object.

Baba et al teaches that an image sensor (39) is used to detect the position of the object to give the information for auto-focus adjustment. Although it does not teach explicitly that the auto-focus sensor or the image sensor is receiving the object information through a first beam splitter, (with respect to the newly added claim 21), however such modification is considered obvious to one skilled in the art since it only involves rearranging the geometry of the device that does not affect the function of the auto-focusing sensor and the auto-focusing adjustment at all.

With regard to claims 7, 17 and 27, Ferguson teaches that the superimposing unit comprises a beam splitter that includes a splitter mirror, (12).

Response to Arguments

11. Applicant's arguments with respect to amended claims 1-30 have been considered but are moot in view of the new ground(s) of rejection.

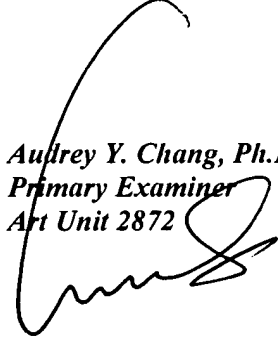
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Audrey Y. Chang, Ph.D.
Primary Examiner
Art Unit 2872



A. Chang, Ph.D.